IL SUONO

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IL SUONO è una monografia che affronta, in maniera esauriente, le capacità musicali degli home computer CBM 64 e VIC 20.
Naturalmente con una attenzione particolare al CBM 64 che ha la possibilità di sfruttare il SID 6581, un integrato sonoro con le proprietà di un sintetizzatore.
Lo scopo è quello di capire la struttura di un programma sonoro attraverso la spiegazione, e di conseguenza l'uso, delle funzioni di base: volume, forme d'onda, ADSR, frequenza, filtri, ecc.
Completa la monografia un utile programma che trasforma la tastiera del CBM 64 in tastiera musicale.

SUONO CBM 64

```
10 rem *** suono ***
20 s=54272
30 forK=stos+24:poKeK,0:nextK
40 poKes+24,15
50 poKes+5,0*16+9
60 poKes+6,1*16+2
70 poKes+1,24:poKes,0
80 poKes+4,33
90 forK=1to100:nextK
100 poKes+4,32:poKes+1,0
```

ESPLOSIONI CBM 64

```
1 rem *** esplosioni ***
10 s=54272
20 fori=stos+24:pokei,0:nexti
30 poKes+24,15
40 ford=7to13:poKes+5,d
50 forn=0to13step3
60 poKes,255:poKes+1,n
70 poKes+4,129
80 fort=1to1500:nextt
90 poKes+4,128
100 fort=1to50:nextt
110 nextn,d
```

SIRENE CBM 64

```
1 rem *** sirene ***
10 s=54272
20 fori=stos+24:poKei,0:nexti
30 poKes+24,15
40 poKes+5,17:poKes+6,246
50 forK=16 to 255 step 16
60 poKes+19,17:poKes+20,246
70 poKes+14,K:poKes+15,0
80 poKes+18,17:poKes+4,33
90 forj=1to100
100 f=8000+4*(peeK(sd+27))
210 fh=int(f/256):fl=f-256*fh
220 poKes,fl:poKes+1,fh
230 nextj,K
240 poKes+18,16:poKes+4,32
```

BOMBARDAMENTO CBM 64

```
1 rem *** bombardamento ***
10 s=54272
20 fori=stos+24:poKei,0:nexti
30 poKes+24,136
40 poKes+5,17:poKes+6,246
60 poKes+19,10:poKes+20,0
70 poKes+14,1:poKes+15,4
80 poKes+18,33:poKes+4,33
90 e=peeK(s+28):ife<240then90
100 f=24000+64*e
220 poKes,fl:poKes+1,fh
230 e=peeK(s+28):ife>32then100
240 poKes+18,16:poKes+4,32
260 poKes+5,11:poKes+6,9
270 poKes,1:poKes+1,3
280 poKes+24,15:poKes+4,129
290 fort=1to1000:next
300 poKes+4,128
310 fort=1to1500:next:goto30
```

TELEFONO CBM 64

```
10 rem *** telefono ***
20 s=54272
30 fori=stos+24:poKei,0:nexti
40 vo=s+24
50 wt=17:ws=33:wp=65:wn=129
60 lf(1)=s:hf(1)=s+1
70 lp(1)=s+2:hp(1)=s+3
80 wf(1)=s+4
90 ad(1)=s+5:sr(1)=s+6
100 fori=2to3
110 lf(i)=fl(i-1)+7
120 hf(i)=hl(i-1)+7
130 lp(i)=lp(i-1)+7
140 hp(i)=hp(i-1)+7
150 wf(i)=wf(i-1)+7
160 ad(i)=ad(i-1)+7
170 sr(i)=sr(i-1)+7
180 nexti
190 poKevo,15
200 poKead(1),9
210 poKesr(1),220
220 poKewf(1),wt
230 forr=1to5
240 forn=1to2
250 fort=1to15
260 poKewf(1),wt
270 poKehf(1),68:poKelf(1),149
280 fors=1to5:nexts
290 poKehf(1),0:poKelf(1),0
300 nextt
310 ford=1to100:nextd
320 nextn
330 forp=1to500:nextp
340 nextr
350 poKewf(1),wt-1
```

CAMPANELLI CBM 64

```
10 rem *** campanelli ***
20 s=54272
30 fori=stos+24:poKei,0:nexti
40 dimfl(8),fh(8)
50 fori=1to8:readfl(i),fh(i):nexti
60 data135,33,162,37,62,42,193,44
70 data60,50,99,56,75,63,15,67
80 poKes+24,15:poKes+3,8
90 poKes+5,11:poKes+6,11
100 forj=1to8
110 poKes,fl(j):poKes+1,fh(j)
120 poKes+4,65
130 fort=1to1000:next
140 poKes+4,64
150 fort=1to50:next
160 next
```

ESEMPIO 1 - VIC 20

```
10 rem *** esempio 1 ***
20 poKe36878,15
30 forK=128to255
40 poKe36875,K
50 fort=1to10:nextt
60 nextK:poKe36875,0
70 poKe36878,0
```

ESEMPIO 2 - VIC 20

```
10 rem *** esempio 2 ***
20 poKe36878,15
30 forK=255to128step-1
40 poKe36875,K
50 fort=1to10:nextt
60 nextK:poKe36875,0
70 poKe36878,0
```

MUSICA VIC 20

```
1 rem *** musica ***
10 poke36878,15
20 readp
30 ifp=-1thenpoke36878,0:end
40 readd
50 poke36875,p
60 fork=1tod:nextk
70 poke36875,0
80 fork=1to20:nextk
90 goto20
100 data 217,400,213,400,223,400
110 data 227,200,234,200,230,400
120 data 227,200,234,200,230,400
130 data 223,400,227,400,217,400
140 data-1
```

CADUTA BOMBA VIC 20

```
10 rem *** caduta bomba ***
20 s=36876:n=36877
30 v=36878
40 forj=230to180step-1
50 pokes,j
60 pokev,(230-j)/4
70 fork=1to30:nextk
80 nextj
90 pokes,0
100 pokev,15
110 poken,180
120 fork=1to250:nextk
130 forj=15to1step-1
140 pokev,j
150 fork=1to200:nextk
160 nextj
170 pokev,0
180 poken,0
190 end
```

CAROSELLO VIC 20

```
10 rem *** carosello ***
20 dimn(12),a(8,3)
30 s1=36876:s2=36875:s3=36874:s4=36877:v=36878
40 forj=1to12
50 print"numero";j;:input n(j)
60 ifn(j)<0orn(j)>8then50
70 nextj
80 forj=1to8
90 forK=1to3
100 reada(j,K)
110 nextK
120 nextj
130 forj=1to12
140 poKes2,a(n(j),2):poKes4,253
150 poKev,15
160 gosub310
170 gosub310
180 poKes1,a(n(j),1):poKes3,a(n(j),3)
190 gosub310
200 poKes1,0:poKes3,0
210 gosub320
220 poKes1,a(n(j),1):poKes3,a(n(j),3)
230 gosub310
240 poKes1,0:poKes3,0
250 ifj/3=int(j/3)andf=0thenf=1:goto160
260 f=0
270 poKes1,0:poKes4,0
280 gosub320
290 nextj
300 goto130
310 forK=1to100:nextK:return
320 forK=1to30:nextK:return
330 data230,193,230,232,200,232,214,206,222,218,209,230
340 data232,214,227,230,218,232,214,222,232,218,224,214
```

TABELLA DEI REGISTRI DEL SID

		BIT n.	7	6	5	4	3	2	1	0
		DECIM.	128	64	32	16	8	4	2	1
INDIRIZZO		FUNZIONE	OSCILLATORE 1							
0	54272	LO FQ	f 7	f 6	f 5	f 4	f 3	f 2	f 1	f 0
1	54273	HI FQ	f 15	f 14	f 13	f 12	f 11	f 10	f 9	f 8
2	54274	LO PW (PL)	pw 7	pw 6	pw 5	pw 4	pw 3	pw 2	pw 1	pw 0
3	54275	HI PW (PH)	/////	/////	/////	/////	pw 11	pw 10	pw 9	pw 8
4	54276	REG. CONT.	RUM.	⊓⊔⊓	◿◿	∧	TEST	R MOD	SYNC	GATE
5	54277	ATT–DEC	ATT 3	ATT 2	ATT 1	ATT 0	DEC 3	DEC 2	DEC 1	DEC 0
6	54278	SOS–RIL	SOS 3	SOS 2	SOS 1	SOS 0	RIL 3	RIL 2	RIL 1	RIL 0
			OSCILLATORE 2							
7	54279	LO FQ	f 7	f 6	f 5	f 4	f 3	f 2	f 1	f 1
8	54280	HI FQ	f 15	f 14	f 13	f 12	f 11	f 10	f 9	f 8
9	54281	LO PW (PL)	pw 7	pw 6	pw 5	pw 4	pw 3	pw 2	pw 1	pw 0
10	54282	HI PW (PH)	/////	/////	/////	/////	pw 11	pw 10	pw 9	pw 8
11	54283	REG. CONT.	RUM.	⊓⊔⊓	◿◿	∧	TEST	R MOD	SYNC	GATE
12	54284	ATT–DEC	ATT 3	ATT 2	ATT 1	ATT 0	DEC 3	DEC 2	DEC 1	DEC 0
13	54285	SOS–RIL	SOS 3	SOS 2	SOS 1	SOS 0	RIL 3	RIL 2	RIL 1	RIL 0
			OSCILLATORE 3							
14	54286	LO FQ	f 7	f 6	f 5	f 4	f 3	f 2	f 1	f 0
15	54287	HI FQ	f 15	f 14	f 13	f 12	f 11	f 10	f 9	f 8
16	54288	LO PW (PL)	pw 7	pw 6	pw 5	pw 4	pw 3	pw 2	pw 1	pw 0
17	54289	HI PW (PH)	/////	/////	/////	/////	pw 11	pw 10	pw 9	pw 8
18	54290	REG. CONT.	RUM.	⊓⊔⊓	◿◿	∧	TEST	R MOD	SYNC	GATE
19	54291	ATT–DEC	ATT 3	ATT 2	ATT 1	ATT 0	DEC 3	DEC 2	DEC 1	DEC 0
20	54292	SOS–RIL	SOS 3	SOS 2	SOS 1	SOS 0	RIL 3	RIL 2	RIL 1	RIL 0
			FILTRO, VOLUME E REGISTRI DI LETTURA							
21	54293	LO TN (TL)	/////	/////	/////	/////	/////	tn 2	tn 1	tn 0
22	54294	HI TN (TH)	tn 10	tn 9	tn 8	tn 7	tn 6	tn 5	tn 4	tn 3
23	54295	RIS–FILT	RIS 3	RIS 2	RIS 1	RIS 0	FILTEX	FILT 3	FILT 2	FILT 1
24	54296	VOL–MODO	3 OFF	HP	BP	LP	VOL 3	VOL 2	VOL 1	VOL 0
25	54297	POT 1	7	6	5	4	3	2	1	0
26	54298	POT 2	7	6	5	4	3	2	1	0
27	54299	OSC 3	O 7	O 6	O 5	O 4	O 3	O 2	O 1	O 0
28	54300	ENV 3	E 7	E 6	E 5	E 4	E 3	E 2	E 1	E 0

TABELLA VALORI DELL'INVILUPPO CBM 64

VALORE	ATTACCO	DECADIMENTO RILASCIO
DEC	Tempo / Ciclo	Tempo / Ciclo
0	2 ms	6 ms
1	8 ms	24 ms
2	16 ms	48 ms
3	24 ms	72 ms
4	38 ms	114 ms
5	56 ms	168 ms
6	68 ms	204 ms
7	80 ms	240 ms
8	100 ms	300 ms
9	250 ms	750 ms
10	500 ms	1 . 5 s
11	800 ms	2 . 4 s
12	1 s	3 s
13	3 s	9 s
14	5 s	15 s
15	8 s	24 s

TABELLA DELLE NOTE MUSICALI VIC 20

NOTA	VALORE	NOTA	VALORE
C	135	G	215
C#	143	G#	217
D	147	A	219
D#	151	A#	221
E	159	B	223
F	163	C	225
F#	167	C#	227
G	175	D	228
G#	179	D#	229
A	183	E	231
A#	187	F	232
B	191	F#	233
C	195	G	235
C#	199	G#	236
D	201	A	237
D#	203	A#	238
E	207	B	239
F	209	C	240
F#	212	C#	241